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ABSTRACT

To understand better how readers learn and recall text information, a study examined one prose learning approach--the selective attention strategy (SAS)--in which text elements are processed, given various degrees of attention, and learned according to their perceived importance. Fifty sixth grade students from an inner city school in a large western city were classified as "good" readers--those scoring above the 80th percentile on the Stanford Achievement Test (SAT)--and "poor" readers, who scored below the 40th percentile. Subjects were divided into three groups: subjects in Group 1 were told to remember the color of the items mentioned in the text; Group 2 subjects were told to remember food and drinks; and Group 3 subjects were told to remember the main ideas of the text. The text was shown in segments of two or three sentences on Apple II+ computer monitors. Probes were sounded at intervals throughout the text; when a probe sounded, subjects were told to immediately press the space bar. After completing the passage each student was given a short answer posttest, and was interviewed using the "Awareness Strategies Interview." Results indicated that although both good and poor readers could successfully employ the SAS, good readers learned more information from a text in general and were more competent at the type of selective learning implied by the SAS. Causal analyses, however, reveal that only the good readers showed any indication of using the SAS in a causal fashion. (Four tables are included and 24 references are appended.) (MM)

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Reading Comprehension of Sixth Grade, Good and Poor Readers:

A Developmental and Methodological Investigation

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INTRODUCTION

For more than a century, educators and psychologists have sought to understand how readers learn and recall text information. Early models of the learning process relied on almost mechanical explanations for how prose material was learned and recalled. For example, Frase (1969) described ways in which inserted questions might "shape" reading behaviors to promote greater learning. Thus, the reader was seen as passive and without any real input into the learning process. More recently, cognitive psychologists such as Anderson (1970), Brown (1980) and Flavell (1979) have proposed that readers are really active, strategic participants in the learning situation. This recent approach has encouraged prose learning researchers to investigate the types of strategies that learners employ in different contexts, particularly as they attempt to learn and recall information from long, expository texts.

The purpose of this paper is to delineate and extend one prose learning strategy--the selective attention strategy (SAS)--that might help us to understand how readers learn and recall text information. Anderson (1982) has suggested a simple formulation of how the SAS might work in a prose learning situation and, in doing so, identified the following processes that together constitute the SAS:

1. Text elements are initially processed to some minimal degree and graded for importance.
2. Extra attention is devoted to elements in proportion to their importance.
3. Because of the extra attention, or a process supported by the extra attention, important text elements are learned better than other elements.

Thus, if Anderson's formulation is correct, readers must engage several different processes if they are to use the SAS. First, they must determine

which text elements are important and which are not. Second, they must be able to focus their attention on those important text elements. Third, they must be able do so effectively.

There is a good deal of research supporting the efficacy of the SAS using adults as subjects. For example, Reynolds, Standiford, and Anderson (1979) conducted a study in which students were asked to read a long passage from a computer screen and were told that they would be tested on the contents when they had finished. Students' perceptions of the importance of text elements were manipulated by using the inserted-question paradigm (Rothkopf, 1966). This involves asking subjects to answer questions inserted into the text at intervals to highlight particular types of information such as proper names or technical terms. The passage was divided into segments that contained information that was either related or unrelated to the questions the students were asked. The results showed that students learned the information made important by the questions better than the control information. Also, students took longer to read text segments containing question-relevant information than text segments that contained control information. These results were seen as supporting the SAS, at least as far as attention duration was concerned, since the students spent more time reading the information on which they demonstrated better learning and recall.

Similar results were obtained for the attention intensity notion in several studies using the secondary task methodology (Britton, Piha, Davis, & Wehausen, 1978; Reynolds & Anderson, 1982; Reynolds & Shirey, in press; Rothkopf & Billington, 1979). The basic principle behind secondary task is the notion of distractibility. The idea is operationalized by sounding a tone while students are reading. Longer reaction times indicated that the subjects

were more intensely involved when they read important rather than unimportant information; subjects also learned and recalled important information better than unimportant information.

Since the SAS seems to be a basic mediator between importance and learning, questions of when readers begin to use it and how well they use it become significant. To find out, Bliss (1984) constructed a story about a hike through a forest to a campsite. The story contained numerous references to the colors of the various flora and fauna encountered on the hike. She had good and poor sixth grade readers study the story using one of two sets of instructions. In the first set, subjects were told to read the story and prepare for a test. The second set was the same as the first except that the students were told that the colors described in the story would be very important on the test. In other words, the subjects were asked to determine text element importance in relation to an assigned task. All subjects were interviewed after the posttest to determine what strategies they used to learn the material.

The results showed that both the good and poor readers who received the "color" instructions spent more time reading and recalled more from text segments that contained colors. Although the good readers learned more information and read more quickly, the pattern of the results was the same for both ability groups. Bliss' results seem to support the notion that sixth graders can successfully employ the SAS in a prose learning situation--but there appear to be some problems.

There seem to be two methodological flaws in Bliss' study that prevent it from being pivotal in determining when the SAS does indeed emerge. First, Bliss did not use a completely crossed design when she manipulated text

importance. In her study, color words were always important and filler words were always unimportant. This could conceivably confound her results if color words appeared to be intrinsically more important to the readers. Indeed, this is possible since a number of Bliss' subjects reported enjoying seeing so many colors that they knew in the story. The second flaw in Bliss' study was that she did not causally analyze her data to clearly determine the role of attention in learning.

The current study remedies both of these difficulties. First, the materials are completely crossed in the sense that materials that are important for some subjects are unimportant for others; hence, the qualities of the words themselves should not impinge on the results. Second, we analyzed our data both with conventional analysis of variance and a version of causal path analysis. In this way we hoped to determine the role of the SAS with sixth graders quite precisely.

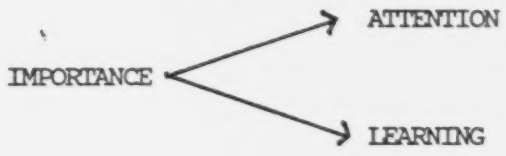
The argument for the need of causal analyses has been made before (Anderson, 1982, Reynolds & Anderson, 1982; Reynolds & Shirey, in press; Shirey & Reynolds, in press) so only the highlights will be given here. Anderson (1982) argues that proving causality is necessary for the utility of the SAS to be supported. In the research just reviewed, the notion that attention plays a causal role in facilitating the learning of important text elements has been only <u>assumed</u>, not demonstrated.

Stated another way, if the SAS is to be supported, researchers must demonstrate that a causal relationship exists among importance, attention, and learning. This relationship is illustrated in the diagram below in which the plus signs (+) indicate a positive, linear relationship between the two factors involved. Thus, if attention were removed, the relationship between

importance and learning would either disappear entirely or at least be significantly reduced.

IMPORTANCE---(+)--->ATTENTION---(+)--->LEARNING

Previous research has demonstrated only that importance is related to attention and to learning, not that the learning of important information is dependent on attention. Indeed, Rothkopf and Billington (1979) suggested that the results of the research just reviewed could describe the following relationship as easily as the one developed by Anderson:



In the model formulated by Rothkopf and Billington, attention is an epiphenomenon that occurs in the vicinity of important text information but does not affect how, or if, it is learned. In order for the SAS to be useful as an explanation for how important text elements are learned, it must be demonstrated that attention plays a causal, not an epiphenomenal, role in the process.

Causal Analysis

Anderson (1982) suggested that the two competing models of the role of selective attention in prose learning could be tested by using a conceptually driven path analysis. Much of the selective attention research is based on the following premise: An independent variable (importance) causes changes in a dependent variable (learning) because of an influence on a mediating variable (attention). Causality for this type of argument can be claimed only if all of the following entailments are met:

1. Importance is related to learning at traditional level of significance [Importance——(+)——>Learning].

2. Importance is related to attention at traditional level of significance [Importance——(+)——>Attention].

3. Attention is related to learning at traditional level of significance [Attention——(+)——>Learning].

4. When the relations of importance to attention and attention to learning are removed, the relationship between importance and learning will have been significantly reduced [Importance——>(-Attention)——>Learning].

Using both conventional analysis of variance and causal analysis in the same study should provide some data as to the correctness of Anderson's (1982) position. If both sets of analyses yield the same results, little is learned; however, if the results of the two are different, serious thinking about claims of causality on the basis of traditional analysis of variance should be considered.

METHOD

Design

A 2 x 3 x 2 mixed factorial design was used in the experiment with two between-subject variables and one within-subject variable. The between-subject variables were ability (good versus poor readers) and assigned instruction (color, food, main idea). The within-subject factor was importance level. Posttest answers were rated as important or unimportant depending upon the subject's instruction category. The dependent measures were reading times and probe response times, which represented the duration and intensity of attention, and scores from the posttest, which represented learning of either important or unimportant material.

Subjects

The subjects were 50 sixth grade students in an inner city school in a large western city. Thirty students were male, twenty were female. Thirty-four students volunteered from two regular classes, and sixteen volunteered from a class for gifted students. Students were given released time from class and a token treat for their participation in the experiment.

One week prior to beginning the experiment, the school administered the Stanford Achievement Test. We used the Total Reading score from this test as a measure of reading ability. "Good readers" were those scoring above the 80th percentile, "poor readers" were below the 40th percentile.

Apparatus

The experiment was run on Apple II+ computers. The text was displayed on the monitor in segments of two or three sentences (27 to 37 words) in length. The subjects advanced the screen to the next segment by pressing the space bar on the computer keyboard. Subjects also wore earphones through which they heard probes (soft beeps) at intervals throughout the text. When they heard a probe, they responded by pressing the space bar as quickly as possible. The time spent reading each segment, as well as the time it took to press the space bar after the probe sounded, were recorded by the computer. The internal clock on the computer is accurate to about one millisecond.

Materials

Two texts were used. The first was a practice text; it was a narrative about two girls swimming at the beach. It was 23 segments long. The purpose of the practice text was to give the subjects the opportunity to use the procedures for advancing the text and responding to the probes. The main experimental text, 36 segments long, was also a narrative. It told about two

boys going on a hiking trip in the mountains. The readability level (Fry, 1977) of both texts was determined to be at the fifth grade level. The experimental text contained three types of segments. In one type of segment the color of an object was mentioned. In the second type a food or drink was mentioned. In third type of segment, called a "filler", neither a food nor a color was mentioned. No segments contained both a color and a food or drink. There were twelve food/drink segments, twelve color segments, and fourteen filler segments. An example of each type of segment follows:

Food Segment

> Pat cooked us a big breakfast of pancakes as we planned for our day's hike. We checked the route on our map while we ate our food.

Color Segment

> Pat was hiking the trail ahead of me. I had no trouble spotting him because he was wearing a yellow t-shirt. I walked quickly to catch up with him.

Filler Segment

> Soon the trail climbed abruptly. Having read the map we knew we were approaching a small lake. We could smell wood burning before we reached the clearing.

The probes were programmed to sound approximately 2/3rds of the way through the target segments. The student's reading time for prior segments was used to calibrate the timing. The probes appeared in four color segments, four food segment, and four filler segments.

The twenty-four item short answer posttest contained eight food/drink, eight color, and eight filler questions. The question relating to the food segment above was: "What did the hikers eat for breakfast?". The color question was: "What color was the t-shirt that Pat was wearing?". The filler

segment was questioned by: "Before they reached the lake, what could they smell burning?".

Procedures

When students reached the experimental area they signed a "subject assignment sheet" that gave them a subject number and randomly assigned them to a treatment group. They were then told that they were about to participate in a study of "how kids read and remember text from computers."

Next, they were instructed as to how to advance the text when they had finished a segment as well as shown how to use the earphones and respond to the probe by pressing the space bar. They then donned the earphones and were given ten probes. This was done to determine their pre-experimental reaction time. Upon completion of the probes, the subject was then told that, "the most important thing is to read and understand, but responding to the probe is also important, so leave your hand on the space bar and respond to the probe as quickly as you can." Then subjects were given the short practice passage. As they read the computer recorded both reading times and probe reaction times to the nearest millisecond. Finally, they were given the instructions for the experimental passage. The original instructions were repeated with the addition of information regarding their task. Group 1 was told to,"Try and remember as much about the color of the items mentioned in the story as you can, because there will be questions on the test that ask about colors." Group 2 was told the same thing about remembering the foods and drinks in the story, and Group 3 was told simply to remember the main ideas for the test because they would be asked questions about them. All three groups were given an opportunity to ask questions before beginning the reading.

Following completion of the experimental passage each student was given a vocabulary test for a period of five minutes as an interpolated task. They were then given the 24 question short answer posttest. There was no time limit for completion of the posttest. Most students completed it in about 10 minutes.

Students were then given a short questionnaire to ascertain background knowledge about computers and about hiking. It was found that all of the students had at least some experience with hiking and camping and some experience with using the computer. Finally, students were interviewed on tape and via note taking by the experimenter, using the "Awareness Strategies Interview" (Shepard, 1986) to gauge their awareness of the metacognitive and study strategies they used during the experiment, and typically use while studying. Questions from the interview were used to ascertain the student's awareness of the strategy that they should have been using while studying the passage on the computer. They were asked for example, "When you were reading the text on the computer, what did you think you were going to have to know to do well on the test?" and later in the interview, "When you were reading the text on the computer, how did you decide what was important?".

RESULTS

Overview of the Analyses

Four separate analyses were conducted. The first three were traditional analyses of variance with ability (good vs poor) and instruction (food vs colors) as between-subject variables and segment type (food, color, and filler) as a within-subject variable. These analyses were conducted on three different dependent variables: reading times, probe reaction times, and learning as measured by the 24-item posttest. The final analysis was a test

of Anderson's causal model. Because the variance of interest in this analysis is within-subject variance, each regression analysis began with the subject's an average score on the criterion measure being the first variable entered into the equation. This removed the between-subject variance and allowed close perusal of the remaining within-subject variance (Pedhauser, 1982).

Reading Time Analysis

There was a significant main effect for ability, $F(1, 22) = 6.65$, $p < .05$ and a significant segment type X instruction type interaction, $F(1, 22) = 5.06$, $p < .05$. The main effect was due to good readers reading more quickly than poor readers. The interaction was due to all subjects spending more time reading those text segments that contained objective-relevant information (see Table 1).

Insert Table 1 about here

Probe Reaction Time analysis

There was only one significant effect in the probe reaction time analysis: the instruction type X segment type interaction, $F(1, 22) = 4.27$, $p < .05$. This result was due to all subjects responding more slowly to the probes when they were inserted into text segments containing objective-relevant information (see Table 2).

Insert Table 2 about here

Posttest Analysis

Analysis of the posttest scores revealed one significant main effect and two significant interactions. The main effect was for reading ability, $F(1, 22) = 5.95$. $p < .05$. This result was due to the good readers scoring higher

than the poor readers. This first significant interaction was the instruction type X segment Type, $F(1, 22) = 18.13$, $p < .01$. This result was due to subjects learning relatively more of the information the pertained to their assigned objective. The second significant interaction was the segment type X instruction type X ability, $F(1, 22) = 4.78$, $p < .05$. This finding resulted from good readers benefiting more from the assigned objectives than did poor readers (see Table 3).

Insert Table 3 about here

Causal analysis

The number of subjects was reduced for this analysis. Only those subjects who said that they were aware of their task and has tried to focus attention on the relevant information were used. This was done to allow the maximum chance for causality to be discovered (Reynolds, Goetz, Lapan, & Kreek, 1988).

Entailment 1. Entailment 1 of Anderson's model tests the relationship between text item importance and learning. The first variable entered into the equation was the subject's average score on the posttest. This was done to remove between-subject variance. Item importance was entered as the next, and only other, variable.

Four groups were tested on this entailment because attention in this study was defined as including both reading times (attention duration) and probe reaction times (attention intensity); consequently, the four analysis groups were obtained by crossing reader ability and attention type.

The analyses for reading times are as follows: For the good readers, Entailment 1 was supported, $F(2, 77) = 6.90$, $p < .01$, beta = .28. The initial

entailment was not supported for the poor readers, $F(2, 77) = .28$. p = NS, beta = .06, so no further testing of the causal model was required for them.

For the probe reaction times analyses, this entailment was supported for neither the good, $F(2, 32) = 1.74$, p = NS, beta = .21, nor the poor readers, $F(2, 32) = .220$, p = NS, beta = .08. No further testing of the causal model was necessary for either group on the probe reaction time dependent measure.

Entailment 2. Entailment 2 tests the relationship between importance and attention. For the good readers, Entailment 2 showed an insignificant though substantial trend, $F(2,77) = 2.71$, $p = .10$, beta = .15. Because of the conservative nature of this analysis, it was decided to test Entailment 3 even though conventional significance had not been reached on Entailment 2.

Entailment 3. Entailment 3 tests the relationship between attention and learning. For the good readers, Entailment 3 was supported, $F(2, 77) = 3.93$, $p < .05$, beta = .24. This allowed us to pursue the analysis to the final step.

Entailment 4. Entailment 4 tests the relationship between importance and learning with the effects of attention removed. If causality is to be proved, the importance to learning relationship must be significantly reduced by this analysis. This was not the case, $F(3, 76) = 5.46$, $p < .05$, beta = .25. There was a small reduction in the importance to learning relationship but it was not enough to imply causality (see Table 4 for a summary of the analyses).

DISCUSSION

The results of this study reveal some expected and some unexpected findings. The notion that both good and poor reading sixth graders could successfully employ the SAS was supported in all three of the analyses of variance. For the learning variable, good readers remembered an average of 71% of the target items and 37.5% of the non-target items. Likewise, poor

readers remembered an average of 40% of the target items and 29.5% of the non-target items. These results are striking because: (1) the good readers had a relatively high learning ratio of target to non-target information--1.90/1--showing the degree to which they were able to focus their attention, while for the poor readers, the same ratio was only 1.35/1. This suggests that not only do good readers learn more information from a text in general, they also are much more able at the type of selective learning implied by the SAS.

Both good readers and poor readers performed similarly on the reading time and probe reaction time measures. Good readers had an average reading time of 9.14 seconds on target segments and an average reading time of 8.54 seconds on non-target segments. Poor readers averaged 18.08 seconds per target segment and 16.08 seconds per non-target segment. For the probe reaction times, good readers had average response times of 840.72 msecs. and 735.41 msecs. for target and non-target segments while poor readers had response times of 829.18 msecs. and 740.58 msecs. on the same segments. All of these findings are in line with what one would expect if subjects were employing the SAS.

The causal analyses revealed that only the good readers showed any indication of using the SAS in a causal fashion. Neither good nor poor readers satisfied the first entailment (important------>learning) using probe reaction times as an indicator of attention. The poor readers also failed to satisfy Entailment 1 using reading times as the measure of attention. As can be seen from Table 4, the good readers showed a pattern of responses that was close to being causal; however, they did not show a significant relation between importance and attention--though a strong trend was evident--and they

showed no significant reduction of the relation between importance and learning when attention was removed.

Consequently, we are left with a dilemma in interpreting these results. On one hand, we have the analysis of variance results for probe reaction time, reading time, and learning, all of which support a selective attention interpretation. On the other hand, we have the causal analysis model which suggests that, as Rothkopf and Billington (1979) proposed, attention is an epiphenomenon that occurred in the vicinity of learning but did not cause it. Another problem is the differential performance of the good and poor readers. If both groups are using the SAS, there must be large differences in the effectiveness with which it is being used because good readers were able to learn so much more information and use their attention so much more efficiently than poor readers. Clearly, if we are to advance our understanding of the role of attention in prose learning, results like the ones in this study must be addressed and understood.

One fruitful way of looking at these results might be in terms of the role of metacognition in learning and retaining prose material. Metacognition--a concept first introduced by Flavell (Flavell, 1979; Flavell & Wellman, 1977) and later expanded by Brown (1980; 1981; Baker & Brown, 1984) refers to knowledge about and control of certain cognitive processes such as attention, memory, and comprehension. The knowledge component of metacognition implies, among other things, that learners know about the strategies (like the SAS) and skills necessary to perform tasks effectively.

The second component--control of cognition--means that learners are able to use metacognitive knowledge to monitor and regulate the success of their strategies for learning. A number of researchers have provided empirical

support for the role metacognition plays in different learning situations (Ghatala, 1986; O'Sullivan & Pressley, 1984; Pressley, Levin, & Ghatala, 1984).

While it is conceivable that metacognitive knowledge develops in relatively young children, metacognitive control appears to develop later, emerging around seventh grade (Paris & Lindauer, 1977). In support of this claim, Garner and Reis (1981) found that lower ability sixth, seventh, and eighth graders failed to monitor comprehension or engage in a look-back strategy. In contrast, higher ability students in sixth and seventh grades exhibited the ability to monitor comprehension although they did not employ the look-back strategy. Only higher ability eighth graders demonstrated both comprehension monitoring and look-back strategy.

In the context of this discussion of metacognition, the results of the present study can be understood. When interviewed at the conclusion of the experiment, virtually all of the sixth graders related that they were able to keep in mind the type of information for which they were looking, and also were able to "spend more time reading" that information to make sure they learned it. Data from the reading time and probe reaction time analyses support their assertions. Both good and poor readers did indeed focus their attention on the target information. The subjects in this study expressed the metacognitive knowledge necessary to engage in the SAS. What they likely did not do (none reported doing so in the interview but no direct question was asked) is monitor their comprehension to ensure they were learning the information to which they were attending; consequently, the measures used in the study reflected the subjects metacognitive knowledge in action—identifying important information and focusing attention on it—but also

reflected large differences in the skill with which the knowledge was applied and monitored, particularly between the good and poor readers.

Reynolds, Wade, Trathen, and Lapan (in press) have offered an analysis of the SAS that might explain the seemingly contradictory results found in the study and the large differences in performance noted between the good and poor readers. They have noted that the SAS is composed of three relatively independent processes: (1) identifying important text elements, (2) focusing either attention duration or attention intensity on them, and (3) learning the important material better as a result of the focused attention. Each of these processes seems to imply a different level of metacognitive awareness that readers must achieve if they are to use the SAS effectively.

Reynolds et al. have labeled these three levels of awareness as follows: task awareness, strategy awareness, and performance awareness. They noted that subjects who could identify text element importance but could not focus attention on those elements were exhibiting task awareness but not strategy awareness. Subjects who could focus attention on the appropriate items but did not increase their learning as a result were said to be exhibiting strategy awareness but not performance awareness. In other words, these subjects focused their attention on the correct material but the act did not increase their learning and recall of that information. Only when readers can identify the correct information, selectively attend to that information, and increase their learning as a result of that increased attention can we say that readers have achieved performance awareness and that they are exhibiting a causal relationship among importance, attention, and learning.

The seemingly contradictory results between the analyses of variance and the causal analysis can be explained by suggesting that virtually all of the

poor readers and many of the good readers in this study were functioning on the strategy awareness level with respect to the SAS. These subjects would allocate additional attention to the target information as is suggested in the analyses of variance but would not monitor their learning well enough to insure that they learned all of the target material to which they attended; therefore, the causal analysis should have revealed no trend toward causality for the poor readers and only a slight trend for the good readers.

The results of this study imply that subjects performing at the strategy awareness phase with respect to the SAS cannot be differentiated from those subjects performing at the performance awareness stage with traditional analysis of variance methodology. These subjects do appear to use attention as an epiphenomenon as suggested by Rothkopf and Billington (1979). They do identify the target items, and they do allocate attention to those items but that additional attention does not causally influence the learning of that important information. Given the Garner and Reis (1981) data, it seems likely that they do not monitor their comprehension closely enough to use attention to causally mediate the relationship between item importance and learning.

The results of this study demonstrate that both good and poor sixth grade readers can identify important text elements and can allocate extra attention that information. They also demonstrate that good readers seem to perform these acts with much greater efficiency than do poor readers. The differences between the results obtained using traditional analysis of variance and causal modeling seem to be due basically to the inefficiency with which these young readers employ the SAS. To date, only good reading 10th graders and college students have been shown to use the SAS efficiently enough to reveal a causal connection among importance, attention, and learning using Anderson's model.

It appears that causal modelling is a conservative test of the SAS but it is necessary if subjects performing at the strategy and performance awareness level are to be differentiated. Traditional analysis techniques seem not to be sensitive to the types of relationships accessed through causal modelling.

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Table 1.
Reading times arrayed by ability, type of instruction, and type of segment.

Segment Type	Ability			
	Good Readers		Poor Readers	
	Assigned Objective			
	Food	Color	Food	Color
Food				
M	8.13*	8.92	16.64*	16.83
SD	1.61	.77	5.48	12.46
Color				
M	8.16	10.15*	15.34	19.52*
SD	1.09	1.73	6.12	16.45

Note: Figures represent average time in seconds per segment.

Table 2.
Secondary task probe reaction times arrayed by ability, type of instruction, and type of segment.

Segment Type	Ability			
	Good Readers		Poor Readers	
	Assigned Objective			
	Food	Color	Food	Color
Food				
M	745.87*	738.66	814.50*	698.67
SD	97.28	85.41	266.78	140.93
Color				
M	732.16	935.58*	782.50	843.85*
SD	142.03	423.08	258.20	257.40

Note: All scores are represented in milli-seconds; * = segments that are perspective relevant.

Table 3.
Posttest scores represented as proportion correct arrayed by ability, type of instruction, and type of segment.

Segment Type	Ability			
	Good Readers		Poor Readers	
	Assigned Objective			
	Food	Color	Food	Color
Food				
M	.71*	.31	.39*	.30
SD	.23	.30	.22	.24
Color				
M	.44	.71*	.29	.41*
SD	.17	.25	.17	.30

Note: All scores represent proportion correct out of eight; * = information that is perspective relevant.

Table 4
Test of the entailments for the causal model among importance, awareness, attention, and learning

Entailment	Beta	Significance level
Good Readers		
After Strategy Awareness		
importance————>learning	.28	$F(2, 77) = 6.90$, $p < .01$
importance————>attention	.15	$F(2, 77) = 2.71$, $p = .10$
attention————>learning	.24	$F(2, 77) = 3.93$, $p < .05$
import—>(- Att)—>learning	.25	$F(3, 76) = 5.46$, $p < .05$
Poor Readers		
After Strategy Awareness		
importance————>learning	.06	$F(2, 77) = .28$, NS
importance————>attention	.11	$F(2, 77) = 5.26$, $p < .05$
Attention————>learning	-.02	$F(2, 77) = .04$, NS
import—>(- Att)—>learning	.06	$F(3, 76) = .31$, NS

Note: The final three entailments for the poor readers were conducted only for completeness since testing would normally stop when Entailment 1 was not supported.